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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/695,414	10/25/2000	Hongyong Zhang	0765-2218	2545

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EXAMINER

PERT, EVAN T

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 02/25/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/695,414

Applicant(s)

ZHANG ET AL.

Examiner

Evan T. Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/420,472.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,13.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Art Unit: 2829

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu et al. (U.S. Patent 5,147,826) in view of Turner et al. (U.S. Patent 5,512,320), each of record.

Liu et al. teach "a method of making a semiconductor device" [col. 1, line 14] comprising:

"forming a semiconductor film comprising amorphous silicon on an insulating surface" [Examples 1 and 2];

"forming a crystallization promoting material comprising a metal in contact with a selected portion of said amorphous semiconductor film using a vapor of a gas of said metal" wherein the "thermal evaporation" to create the "vapor" *inherently* utilizes "a chamber" [Example 2]; and

"crystallizing said semiconductor film in contact with said crystallization promoting material" using "heat" [abstract].

Regarding claims 2, 5, 8, 11, 14 and 17, Liu et al. teach that the "metal" is one of "Pd" and "Ni" [Example 2].

Regarding claims 3, 6, 9, 12, 15 and 18, Lie et al. teach their method can include "patterning the crystallized semiconductor film to form an active layer of a thin film transistor (TFT)" [col. 1 taken with col. 4, lines 29-34].

Liu et al. are silent about the *specifics of the chambers or chamber arrangements* used for the proper practice of their methodology, and clearly rely on the knowledge known to one of ordinary skill in the art to determine what type of *apparatus* should be used for depositing the sequential thin films of amorphous silicon and palladium or nickel prior to the "annealing" which is critical to their invention [e.g. claim 1].

While Liu et al. are silent about the *specifics of appropriate chamber arrangements for their "depositing" and "annealing,"* Turner et al. are not: Turner et al. teach a "apparatus" with means for "annealing" deposited films and "having *improved throughput.*" Turner et al.'s "semiconductor processing" apparatus is highly applicable since it is specifically directed at depositing films on glass substrates with annealing and improved throughput [see Example 2 of Liu et al. for example].

To practice their invention, Liu et al. simply need a chamber arrangement that can be used to deposit the metal film on the amorphous semiconductor film and can also anneal the films together at the much lower temperatures (e.g. below 700°C) made possible by the crystallization promoting material that they specifically teach:

It would have been obvious at the time of applicant's claimed invention to adopt the chamber taught by Turner et al. for practicing the invention taught by Liu et al., to arrive at applicant's claimed invention, inherently (wherein the claimed "not exposing" limitations are inherent to the "improved throughput" apparatus taught by Turner et al.).

One of ordinary skill in the art would have been motivated to use the apparatus taught by Turner et al. for "increased throughput" as taught by Turner et al. [abstract in view of column 1].

Upon adopting Turner et al.'s chamber for performing the depositions of amorphous silicon and nickel in the invention of Liu et al., one would *inherently* "successively form the crystallization promoting metal film after forming the amorphous silicon film without exposing to air outside the chamber" because the concept of "without removing the substrate from a vacuum environment" taught by Turner et al. is *equivalent* to "without exposing the formed films on a substrate to air outside the chamber."

Response to Arguments

2. Contrary to applicant's understanding, the Turner et al. reference is a relevant reference because it teaches a semiconductor device manufacturing apparatus with "improved throughput" useful for "annealing" semiconductor "films deposited on glass".

As pointed out by applicant, Turner et al. are silent about a step named and called out as "crystallizing" but do specifically disclose "processing" and "annealing" at "elevated temperatures" for semiconductor films on glass substrates, as is notably required to practice the invention of Liu et al. [e.g., see claim 1]. The act of "annealing a semiconductor film" (claim 1 of Liu et al.) is taught by both the Turner and Liu references, so using the Turner et al. apparatus would be a natural choice for "annealing" after "depositing" a film:

Both "depositing" and "annealing" are required in the invention of Liu et al.. and Turner et al.'s apparatus can perform these critical steps with "increased throughput."

3. Contrary to applicant's mischaracterization, the "oxygen ambient" disclosed in Liu et al. is not "air outside the chamber." Liu gives no suggestion that one should purposefully expose to arbitrary "air outside the chamber." Further contrary to applicant's indication, Liu et al. are actually *silent* about "the air outside the chamber."

4. Applicant argues something special about "not exposing to air outside the chamber" as compared to the invention disclosed by Liu et al.. Yet, applicant's specification fails to indicate that "not exposing to air outside the chamber" is critical or yields any unexpected result: Applicant's disclosure tacitly groups the possibilities of 'exposing to air outside the chamber' (argued by applicant as "taught by Liu et al.") and 'not exposing to air outside the chamber' together, without distinguishing any unexpected result or advantage not already known in the art. Quoting applicant's specification:

"[crystallization *annealing* occurs] after the substrate having an amorphous film is taken from the chamber, or may be performed continuously in the chamber without taking out the substrate" [page 6, lines 15-16, emphasis added]

5. Contrary to applicant's indication, the reason for combining Turner et al. with Liu et al. is a valid reason: increased throughput for processing (annealing) films on glass substrates:

Liu et al. want increased throughput for processing (annealing) (crystallizing) films on glass substrates [col. 2, lines 28-30]. Turner et al.'s apparatus offers "improved throughput" for the "depositing" and "annealing" required in Liu et al. who need

something for "depositing" (the crystallization promoting material) and "annealing" (the amorphous semiconductor film with metal crystallization promoting material) to cause the inherent "crystallizing" to occur at lower temperatures.

The use of an apparatus taught by Turner et al. would be a natural choice for one of ordinary skill in the art who wants to perform the "depositing" and "annealing" in Liu et al. with the "improved throughput" offered by the apparatus taught by Turner et al..

6. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to combine Turner et al. and Liu et al. is clearly set forth above.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan T. Pert whose telephone number is 703-306-5689. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 703-308-1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ETP
February 19, 2003


EVAN PERT